

WHAT IS CLAIMED IS:

1. A semiconductor light-emitting device comprising:
first and second semiconductor layers each of a first conductivity type;
5 a third semiconductor layer of a second conductivity type provided between the first and second semiconductor layers;
an active layer provided between the second and third semiconductor layers, the active layer emitting light with charge injected therein from the second and third semiconductor layers; and
10 a graded composition layer provided between the active layer and the third semiconductor layer to have a varying composition which is nearly equal to a composition of the active layer at an interface with the active layer and to a composition of the third semiconductor layer at an interface with the third semiconductor layer.
- 15 2. A semiconductor light-emitting device comprising:
first and second semiconductor layers each of a first conductivity type;
20 a third semiconductor layer of a second conductivity type provided between the first and second semiconductor layers, the third semiconductor layer having a forbidden band as an electron energy band which is smaller in width than a 25 forbidden band in each of the first and second semiconductor

layers; and

a graded composition layer provided between the first and third semiconductor layers to have a varying composition which is nearly equal to a composition of the first 5 semiconductor layer at an interface with the first semiconductor layer and to a composition of the third semiconductor layer at an interface with the third semiconductor layer,

the third semiconductor layer emitting light with 10 charge injected therein from the second and third semiconductor layers.

3. The semiconductor light-emitting device of claim 2, wherein an impurity concentration in the second semiconductor layer is higher at least in a region thereof opposed to the 15 first semiconductor layer than in the first semiconductor layer.

4. A semiconductor light-emitting device comprising:
first and second semiconductor layers each of a p-type conductivity; and

20 a third semiconductor layer of an n-type conductivity provided between the first and second semiconductor layers, the third semiconductor layer having a forbidden band as an electron energy band which is smaller in width than a forbidden band in each of the first and second semiconductor 25 layers,

the third semiconductor layer emitting light with charge injected therein from the second and third semiconductor layers,

an energy value at an upper end of a valence band as an
5 electron energy band being lower in the first semiconductor layer than in the second semiconductor layer.

5. The semiconductor light-emitting device of claim 4,
wherein an impurity concentration in the second semiconductor
layer is higher at least in a region thereof opposed to the
10 first semiconductor layer than in the first semiconductor
layer.

6. A semiconductor light-emitting device comprising:
first and second semiconductor layers each of an n-type
conductivity; and
15 a third semiconductor layer of a p-type conductivity
provided between the first and second semiconductor layers,
the third semiconductor layer having a forbidden band as an
electron energy band which is smaller in width than a
forbidden band in each of the first and second semiconductor
20 layers,

the third semiconductor layer emitting light with charge injected therein from the second and third semiconductor layers,

an energy value at a lower end of a conduction band as
25 an electron energy band being higher in the first

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semiconductor layer than in the second semiconductor layer.

7. The semiconductor light-emitting device of claim 6,
wherein an impurity concentration in the second semiconductor
layer is higher at least in a region thereof opposed to the
5 first semiconductor layer than in the first semiconductor
layer.

~~8. A semiconductor light-emitting device comprising:~~
first and second semiconductor layers each of a first
conductivity type;

10 a third semiconductor layer of a second conductivity
type provided between the first and second semiconductor
layers, the third semiconductor layer having a forbidden band
as an electron energy band which is smaller in width than a
forbidden band in each of the first and second semiconductor
15 layers; and

a lightly doped semiconductor layer provided between
the first and third semiconductor layers, the lightly doped
semiconductor layer having an impurity concentration which is
lower than an impurity concentration in each of the first and
20 third semiconductor layers,

the third semiconductor layer emitting light with
charge injected therein from the second and third
semiconductor layers.

9. The semiconductor light-emitting device of claim 8,
25 wherein the lightly doped semiconductor layer is an undoped

layer undoped with an impurity.

10. The semiconductor light-emitting device of claim 8, wherein the lightly doped semiconductor layer has the second conductivity type.

5 ~~11.~~ An apparatus for driving a semiconductor light-emitting device comprising first and second semiconductor layers each of a first conductivity type and a third semiconductor layer of a second conductivity type provided between the first and second semiconductor layers, the
10 apparatus comprising:

constant-current control means;
light-emission control means for controlling a state of
light emitted from the semiconductor light-emitting device;
and

15 specified-potential applying means for applying a specified potential to the third semiconductor layer of the semiconductor light-emitting device,

the constant-current control means supplying a specified driving current to the second semiconductor layer
20 of the semiconductor light-emitting device,

the light-emission control means adjusting an amount of light emitted from the semiconductor light-emitting device by applying different voltages to the first semiconductor layer or by bringing the first semiconductor layer into different
25 states of impedance.

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